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near the eye-piece a ready adjustment of the focus will be obtained. This method has the great advantages of simplicity and cheapness; its defects will be ascertained by the inventor when he comes to try it.

J. E. K.

OBSERVATIONS ON THE NEAR APPROACH OF MARS AND SATURN ON SEPTEMBER 19, 1889.

The eastern sky was thick with haze when the two planets rose, and they were not visible until a considerable altitude was attained. At about 4 A. M. they could be seen dimly with the naked eye; *Mars*, small and insignificant, slightly east of *Saturn*. As soon as the images were at all measurable, I made a series of micrometrical observations of the two for position angle and distance, and for differences of right ascension and declination, using the 12-inch equatorial.

Following are the measures which are corrected for refraction in distance and in the $\Delta \delta$ and $\Delta \alpha$; the times being Mt. Hamilton mean time:

		d.	*h.*	*m.*	*s.*	
1889.	Sept.	19	16	16	39.	Position angle of *Mars*, 101°.0 (3).
"	"	19	16	24	24.	Dist. betw'n outer limbs of *Mars* and *Saturn*, 356″.1 (3).
"	"	19	16	29	14.	" " nearer " " " " 342″.3 (3).
	"	19	16	34	19.	" " center and center, 358″.8 (3).
"	"	19	16	39	49.	Position angle of *Mars*, 101°.8 (4).
"	"	19	17	36	29.*	$\Delta \delta$ ♂—♄ $-1' 39''.2$ (5) apparent.
"	"	19	17	45	49.*	$\Delta \alpha$ ♂—♄ $-0^m 29^s.91$ (11) apparent.

The most striking feature was when the two planets were fading from the advent of daylight. At the approach of day *Saturn* assumed a pale, ashy hue, with a slight tinge of yellow, while *Mars* retained its lustre in a surprising manner, being of a strong orange yellow in color; its north polar cap stood out strikingly towards the close of the observations, a dark marking being also visible near the middle of the disc. *Saturn* ceased to be visible in the telescope at 18h. 6m., the last glimpse being had a few seconds earlier. At this time *Mars* was easily conspicuous, the sun being 5° or 6° high and the sky pretty thick. At 18h. 10m. *Mars* began to grow pale. At 18h. 25m. it was still visible but very pale and easily lost in the field, though it could have been followed for some time longer. By the time the planets were high enough to observe with the large telescope they had separated too far to be brought into the field of view of the largest eye-piece. E. E. B.

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* These times are for the bisection of *Mars*.

MT. HAMILTON, Sept. 20th, 1889.

THE USES OF TRAILS OF STARS IN MEASUREMENTS OF POSITION OR OF BRIGHTNESS.

Photographs of star groups may be made for either one of three important objects. They may serve — (*a*) to give a picture merely; (*b*) for measurement of the relative positions of the stars of the group; or, (*c*) for measurement of the photographic magnitudes of the stars of the group. For the first purpose the stars must be photographed as points or *dots*. Such dots may also be used for the purposes *b* and *c*. For the purposes *b* and *c* it will often be very advantageous to employ *trails* instead of *dots*. The difference of declination of two stars, A and B, can be more accurately determined from measures made of the distance apart of their *trails* than from measures of the distance of the corresponding *dots;* just as a star can be more accurately bisected in declination by a Z. D. micrometer than in R. A. by a fixed thread. Hence the use of trails in R. A. If now we can produce trails in declination, a corresponding advantage can be had for measures of differences of R. A. The negative plate of the great equatorial is to be mounted on a compound slide-rest. The upper slide-rest which carries the plate has a motion in any desired direction (usually in R. A.), and the lower slide-rest, which carries both plate and upper rest, has a motion at right angles to the direction for the upper slide.

If a clock-work motion is attached to the lower slide, this slide can be moved in declination (say) for a certain distance (only). It will finally come to the end of its run. Suppose the telescope at rest, the objective covered and the lower slide-rest moving in declination. If an exposure is now made, we shall have trails suitable for measuring differences of R. A. After a few minutes, the lower slide comes to the end of its run. Trails in R. A. are now produced, which are suitable for measures of differences of declination.

The direction of motion of the lower slide may be ordered in *any* desired position angle. Thus we may choose the direction of the first set of trails so as to be most advantageous for the subsequent measures. The second set of trails will always be in R. A. The angle between the first and second directions will define the